RURAL ENTERPRISES, INC.

(NASA-CR-176362) [RURAL ENTERPRISES, INCORPORATED REPORT OF SIGNIFICANT ACTIVITIES AND ACCOMPLISHMENTS] Quarterly Status Report, period ending 30 Sep. 1985 (Rural Enterprises) 51 p HC A04/MF A01 G3/85

N86-17228

Unclas 16492

P.O. Box 1335
Durant, Oklahoma 74702-1335
[405] 924-5094

NASA CONTRACT NO. NASW-3963

STATUS REPORT FOR THE

QUARTER ENDING SEPTEMBER 30, 1985

SUBMITTED BY RURAL ENTERPRISES, INC.

10 WALDRON DRIVE, DURANT, OK

(405) 924-5094

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STATUS REPORT FOR THE QUARTER ENDING
SEPTEMBER 30, 1985

The RTA Team at Rural Enterprises, Inc. submits the following quarterly report which reviews the team's accomplishments in support of the scopes of work for the above referenced contract. The report covers all significant activities occurring between July 1, 1985 and September 30, 1985.

TASK 1: PROMOTE THE TRANSFER OF NASA TECHNOLOGY AND IDENTIFY SPECIFIC TRANSFER OPPORTUNITIES

1. Rural Enterprises' staff members were engaged in several outreach activities during this quarter. These activities are highlighted in Appendix A of this report. A new brochure was developed and highlights in a more comprehensive manner the services available through Rural Enterprises and specifically technology transfer. A copy of this brochure is included in Appendix A.

2. David Jackson, Project Engineer, submitted five NASA technologies to the Oklahoma Cooperative Extension Newsletter for publication in the Technology Available section. July, August and September OCES Newsletters, Technology Available sections are attached as Appendix B. Three (3) inquiries were received regarding NASA technologies published and further information was provided.

3. A direct result of Rural Enterprises' promotional efforts can be seen in the fact that the center received 118 inquiries this quarter for additional information.

TASK 2: IDENTIFY PROBLEMS AMENDABLE TO SOLUTION BY APPLICATION OF NASA TECHNOLOGY

1. Rural Enterprises completed 24 private sector innovation evaluations during this quarter. Each of these 24 were given a NASA technological needs assessment during the formal evaluation process.

2. Updates on specific NASA projects are explained in detail under TASK 4.

3. A secondary questionnaire for the Industrial Development Initiative (IDI) was developed and disseminated during this reporting period. A copy of this questionnaire is attached in Appendix C. The questions concern the prospective company's operation. Through identifying existing capabilities and needs, a more comprehensive means of matching potential users of NASA technologies can be provided.

TASK 3: DEVELOP PROBLEM STATEMENTS FOR VALIDATION WITHIN THE NASA NETWORK

1. REI developed a problem statement for every innovation reaching the feasibility study stage. During this quarter, 3 problem statements were developed and submitted through the NASA Network.

2. The problem statement format used in the past is being revised pursuant to Ray Whitten's recommendation. The new format will be more uniform with NASA standards. Work is continuing on this format and the final format will be included in the quarterly report for the period ending 12/31/85.

TASK 4: ASSIST IN THE DEVELOPMENT OF PROPOSED SOLUTIONS TO VALIDATED PROBLEMS

1. In an effort to define solutions for the technological needs of Rural Enterprises' current projects and the needs of the service area in general, the RTA Team completed 37 preliminary assessments and 9 secondary evaluations on available NASA technology. Listings of these technologies are attached in Appendix D.

2. Additions to the technology data base for the reporting period include the 9 NASA technologies that received secondary evaluation, plus 5 Corps technologies and the 24 private innovation evaluations. A complete edit and review of the technology data base was conducted and resulted in the following cumulative yield: 93 NASA technologies, 97 Corps technologies, 97 fair entries and 257 private sector innovations for a total of 544.

3. Detailed project updates for Rural Enterprises' current active NASA projects are included as Appendix E.

TASK 5: MAINTAIN EFFECTIVE LIAISON WITH NASA CONTRACTORS

1. Problem statements were submitted and phone coversations and letters were sent to the NASA contractors at various times during this quarter.

2. Specific information was received and relayed to REI clientelle regarding the SBIR program.

TASK 6: PREPARE AND DELIVER REPORTS AND REPRESENTATIONS

1. This quarterly report fulfills part of this contract requirement.

2. Rural Enterprises is awaiting response from Ray Whitten, Technical Monitor, regarding possible dates to orally present this quarterly report.

GOALS FOR THE COMING QUARTER

During the October 1 through December 31, 1985 quarter, Rural Enterprises, Inc.'s staff goals in support of the NASA contract are as follows:

1. Further development of projects already existing:
   (a) Non-invasive Measurement of Arterial Blood Pressure (Corazonix Corporation)
   (b) Instant Burger cooker (Smokaroma)
2. Continue developing problem statements on all evaluations accepted for feasibility status.
3. Develop a problem statement on Empower, Inc. Motor-Aid product.
4. Preliminary evaluation of a minimum of twenty-five (25) NASA technologies.
5. Secondary evaluation of a minimum of six (6) NASA technologies.
6. Preparation of the quarterly report.
7. Continue identification and data base development of private companies for NASA technology briefings.
8. Continue design of evaluation instrument specifically suitable for NASA technology.
9. Continue sending selected technologies to OCES newsletter.
10. Continue development on Rural Enterprises, Inc.'s technology data base.
11. Continue contacting entities that the needs questionnaire identified as interested in Technology Transfer.
12. Make field visits to a minimum of 50 businesses to identify technology needs.
13. Complete Revised Problem Statement format

APPENDIX A

OUTREACH ACTIVITIES

OUTREACH ACTIVITIES
QUARTER ENDING SEPTEMBER 30, 1985

7/02/85	Meeting with Doyle Chase, SODA, to discuss Industrial Development Initiative (IDI)
7/2-3/85	Trip to RedArk McAlester, OK (Purpose: to develop database for IDI.)
7/3/85	350 new annual progress reports were mailed with a cover letter from Mr. Hardy. The mail list consisted of: service area Chambers of Commerce OKC & Tulsa Chambers of Commerce ODED & Governor's office DECA offices Sub-state Planning Districts REI contractors REI clients & inquiries list KAVTS superintendents U.S. & state senators & representatives REI consultants, i.e., accountants, patent attorneys, eng. firms, mktg. firms we've worked with. REI workshop participants
7/9/85	IRS Withholding Tax Seminar Oklahoma City, OK REI attended
7/10/85	Meeting with KEDDO regarding IDI.
7/10-11/85	Field investigation to observe shop testing for client's product at NIPER, Bartlesville, OK. (Part of monitoring activities for client's DOE grant)
7/10-11/85	Field investigation and market research for Limelite. Sherman/Denison area
7/11/85	Radio spot on KKAJ Radio Station Ardmore, OK
7/11/85	Meeting with Dr. Zegrain, Tulsa University, regarding DOE grant for Instant Burger.
7/11-12/85	Field investigation and market research for Limelite. Tulsa, OK area.

7/12/85	Open house for Southern Star Aircraft Paint Ardmore, OK (REI attended.)
7/15/85	Meeting with Monte England for interview to write OCES monthly newsletter story and to go over copy and layout on REI's new summary brochure.
7/15/85	Oklahoma Enterprise Forum Tulsa, OK (REI made guest presentation along with David Albert of Corazonix.)
7/19/85	Planning meeting with SODA Lake Texoma Lodge 109 attendees
7/22/85	Worked with OCES office in Durant on a mass mailout that their office is coordinating. The mail list includes 4,000 names originating from eight Co. Extension Agents mail lists. REI's fact sheet will be included in each packet mailed.
7/26/85	Mr. Hardy appeared on the Rudy Dockray Show - noon interview, KTEN - TV in Ada. A good general overview of REI's services was given.
7/25-27/85	PETROTECH '85 - Oklahoma Petroleum Technology Show, Oklahoma City, OK. Client Dick McArthur was an exhibitor at this show. REI assisted him with his table top display. One of our engineers also accompanied him to help market the STABBER at this show. McArthur's booth was shown on KWTV Channel 4 out of OKC. Several good contacts were made.
7/29/85	VENTURE magazine correspondent Ed Andrews contacted REI for an interview. VENTURE's Oct. or Nov. issue will feature innovation centers and REI could possibly be mentioned. A media packet was sent as requested.
8/06/85	Financial Packaging Marketing Effort American National Bank Shawnee, OK
8/07/85	Meeting with Charles Nall, Ada, OK regarding Industrial Development Initiative (IDI)

8/12/85	A letter was sent to Durant civic club presidents requesting a list of all Oklahoma club presidents for the Lions, Rotary and Kiwanis. We hope to schedule many more slide tape presentations with these clubs throughout the state.
8/13/85	Jerry Reid, Manager of Marketing for Tulsa Port of Catoosa, visited REI to tour our incubator facility and to gather information for a potential incubator at the port.
8/13/85	Meeting on UDAG Project (Saunier) with HUD officials. Ft. Worth, TX
8/13/85	Field investigation for potential project - Andy Marr Ardmore, OK
8/15/85	Steve Hardy, Ron Pennington, Ricki Jackson and REI client George Karatzou attended the 10th Annual Symposium for Small and Disadvantaged Businesses at Rose State College in Oklahoma City, Oklahoma. REI's booth was well received at the trade show and several contacts were made with contractors attending the symposium.
8/16/85	Hubert Quintana, Executive Director, and Steve Massy, Planning and Development Specialist for the S.E. New Mexico Economic Development District, toured REI's facility and visited with several staff members to gather information for their incubator planned for Roswell, NM.
8/20/85	Field investigation and meeting with business contemplating expansion Seminole, OK
8/21/85	IDI follow-up Ada, OK
8/21/85	New Product & Process Fair Board Planning Meeting Kiamichi Area Vo-Tech School Atoka, OK
8/21/85	Article published in Tulsa Tribune newspaper regarding incubators and mentioning REI.
8/23/85	Dedication of Three Rivers Produce Lane, OK
8/23/85	Financial Packaging Marketing Effort American National Bank Shawnee, OK

8/23/85	Financial Packaging Marketing Effort First National Bank Ada, OK
8/26/85	Presentation of Loan proposal to First National Bank, Seminole, OK
8/27/85	"Gap Financing" Seminar Hyatt Regency, Ft. Worth, TX (REI attended)
8/28-30/85	Trip to CERL, Champaign, IL to study Corps Technology
8/30/85	Meeting with Ardmore Development Authority Ardmore, OK (Promotion of REI, explanation of and outreach for technology transfer opportunities and financial packaging services.)
8/85	REI was featured in Economic & Industrial Development News.
8/85	REI's Expo '85 ad appeared in the August issue of Oklahoma Business.
9/03/85	Meeting with client to review and execute SBA 503 and 7(a) application packages Poteau, OK
9/03/85	Informational Seminar Central National Bank Poteau, OK (REI presented)
9/03/85	Community Meeting Antlers, OK (REI was guest speaker. TOPIC: Economic development and REI's services)
9/04/85	Meeting with Hugo Chamber of Commerce to promote REI and its financial packaging services.
9/05/85	Financial Packaging Marketing Effort Farmers Exchange Bank Antlers, OK
9/05/85	Financial Packaging Marketing Effort Citizens State Bank Hugo, OK
9/05/85	Meeting with financial client to review SBA 503 application Ardmore, OK

9/05/85	Financial Packaging Marketing Effort Security First National Bank Hugo, OK
9/05/85	Financial Packaging Marketing Effort American National Bank Durant, OK
9/05/85	Field investigation for prospective financial client -- Ardmore, OK
9/06/85	Meeting with City Manager of Madill, OK to promote city certification and the UDAG program.
9/06/85	Meeting with the Marietta Chamber of Commerce to promote REI's services and highlighting financial packaging services.
9/09/85	Financial Packaging Marketing Effort First Bank of Marietta Marietta, OK
9/09/85	Financial Packaging Marketing Effort First National Bank of Marshall County Madill, OK
9/09/85	Financial Packaging Marketing Effort Madill Bank & Trust Company Madill, OK
9/10/85	Meeting with City Council, McAlester, OK (This meeting constituted the first "Citizens Participation Hearing" for the UDAG project and provided an opportunity to explain this program and REI's services.)
9/11/85	New Product & Process Fair Board Planning Meeting; Kiamichi Area Vo-Tech School Atoka, OK
9/12/85	Meeting with City Manager, Atoka, OK Purpose: Promotion of UDAG program and orientation of REI's services.
9/12/85	Financial Packaging Marketing Effort Atoka Chamber of Commerce Atoka, OK
9/12/85	Radio interview to promote REI & its services KEOR Radio Atoka, OK
9/12/85	Financial Packaging Marketing Effort Atoka State Bank Atoka, OK

9/16/85	Meeting with Jim Miles, DECA to obtain more information regarding programs available through DECA
9/16/85	Meeting with John Baker, OIFA, to obtain information regarding programs available through OIFA
9/17-19/85	OKLAHOMA BUSINESS & INDUSTRY EXPO '85 Myriad, Oklahoma City, OK (REI provided display booth and presented seminar on incubators. Several employees attended several of the other workshops presented.)
9/18/85	Meeting with Oklahoma City HUD Officials to discuss McAlester UDAG project.
9/19/85	Financial Packaging Marketing Effort Chandler Chamber of Commerce Chandler, OK
9/19/85	Financial Packaging Marketing Effort First National Bank Chandler, OK
9/19/85	Financial Packaging Marketing Effort First National Bank Cushing, OK
9/19/85	Financial Packaging Marketing Effort Union Bank Chandler, OK
9/19/85	Financial Packaging Marketing Effort Bank of Cushing Cushing, OK
9/19/85	Financial Packaging Marketing Effort Industrial Committee Cushing Chamber of Commerce
9/19/85	Financial Packaging Marketing Effort Stillwater Community Bank Stillwater, OK
9/20/85	Financial Packaging Marketing Effort Stillwater National Bank Stillwater, OK
9/20/85	Financial Packaging Marketing Effort First National Bank Stillwater, OK
9/20/85	Field investigation to package UDAG application

McAlester, OK

9/23/85 OU -- Ground Water Quality Protection Course
University of Oklahoma, Norman, OK
(REI attended)

9/24/85 Second Citizens Participation Hearing for UDAG project; McAlester, OK

9/26/85 Meeting with prospective client
Ardmore, OK

9/26/85 Meeting with prospective client
Ada, OK
(Entrepreneur from California.)

9/26/85 Meeting with prospective client
Ada, OK
(Inventor of new intraveneous system -- IV)

9/26/85 Meeting with General Dynamics Corporation
Fort Worth, TX
(Purpose: Industrial Development Initiative -- to locate contracting opportunities and needs.)

9/28/85 OKLAHOMA STATE FAIR - Inventors' Day
Oklahoma City, OK
(REI provided table top exhibit and was featured as a luncheon speaker.)

9/30/85 Meeting with client -- George Karatzou --
McAlester, OK
(Purpose: First business established from "spinning out" of REI incubator -- closing on sale of REI's equity.)

9/30/85 Meeting with U. S. Steel, McAlester, OK to identify sub-contracting needs & opportunities.

REI OFFERS

Serving a wide variety of clients requires REI's professional staff to offer a comprehensive set of new product and business development support services.

INNOVATION & BUSINESS EVALUATION PROGRAM

An independent evaluation of a client's idea can assist him/her in making a decision as to whether the idea is commercially feasible and whether further development is warranted. Teams of specialists with expertise in engineering, marketing and finance evaluate each idea based on 33 factors. When the evaluation is complete, a computer printout of the evaluators' analysis is sent to the client. It will indicate what we believe are the innovation's strengths and weaknesses. REI will then actively assist in the development of those ideas that:

- have market potential
- fall within the scope of REI resources
- will have a positive economic impact on the REI service area
- elicit a commitment from the client

The next step for ideas meeting the above criteria is a feasibility study. The client's idea is given a more in-depth marketing, engineering and financial analysis during this secondary evaluation phase. The results of the feasibility study will then determine whether or not the idea will become an active REI project that has sufficient potential to warrant the following additional services.

TECHNOLOGY TRANSFER

Each new product, process and business evaluated at REI is given a technological needs assessment. As specific technology problems are identified, REI is able to call on the resources of many federal laboratories including the National Aeronautics and Space Administration and the U.S. Army Corps of Engineers. In cooperation with Oklahoma State University's Cooperative Extension Service Program, a technology transfer agent has been provided to assist in technology transfer efforts. Technology solutions are sought from the wealth of technical resources provided by these as well as other private, state, and federal organizations.

ENGINEERING

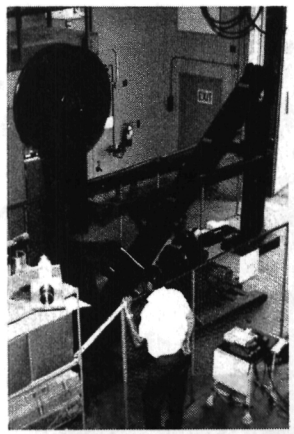
REI has qualified engineers on staff to assist in the development of projects' manufacturing and design engineering needs. Our engineers concentrate on ways to improve production methods, reduce manufacturing cost, and/or improve the performance of the client's idea.

MARKETING

REI's marketing specialist first compiles the basic marketing data consisting of primary and secondary research on a project. Working with the client a marketing plan is then developed to include a client's promotional strategies, e.g. brochures, direct mail campaigns, distribution channels.

FINANCIAL ASSISTANCE

As a certified development company authorized by the Small Business Administration, REI provides assistance in procuring working capital and fixed asset financing. A technical assistance contract from the Department of Housing and Urban Development allows us to package Urban Development Action Grant applications for certified locations as well as provide economic development assistance from many other HUD Programs. Additionally the Economic Development Administration has provided a revolving loan program which is administered by REI for lower interest rate financing than many conventional sources.



BUSINESS INCUBATORS

In cooperation with the Oklahoma State Department of Vocational Technical Education and the Kiamichi Area Vocational Technical School System, REI initiated the building of four reduced rent shell buildings and tooling for the incubation of new businesses. Incubators are tools specifically designed to support entrepreneurial efforts in all areas of training. The purpose of our incubators is to help successfully launch new small businesses into REI service area communities.

CLIENT COSTS

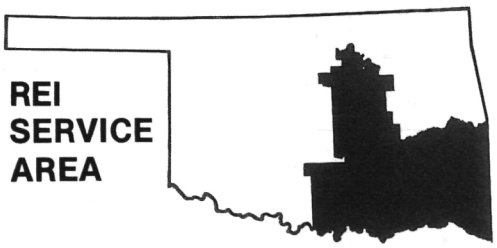
There is a $75.00 fee for each innovation and business evaluation conducted. This initial fee is applicable to registration and evaluation only, and does not apply to or insure any further assistance by REI. When an idea becomes an active REI project, then a contract is negotiated with the client stating how REI will be reimbursed for services rendered. This may consist of a fee for services, a royalty position on the product, or an equity position in the company. The amount of these royalties or equitable interests will vary from project to project.

REI'S PURPOSE

Rural Enterprises, Inc.'s mission is to create new private sector jobs by creating and expanding businesses in Southeastern and South Central Oklahoma. As an innovative industrial development corporation, REI implements economic development with a hands-on approach. Instead of focusing on industry relocations, REI concentrates on growing our own industry and expanding existing industry. Under the leadership of Congressman Wes Watkins, REI was initiated in 1980 and in 1983 was designated as a national demonstration model. REI's practical and innovative approach to create new businesses through the free enterprise system is a unique concept developed through the assistance of the USDA-Office of Rural Development Policy that has impact potential for rural development throughout America.

REI'S CLIENTS

Inventors' and entrepreneurs' ideas are solicited nationwide for commercialization in REI's service area. REI was established to assist in the minimization of the risk involved in bringing a new product or process to the marketplace as well as to assist existing businesses with a controlled growth plan of action. Some new products or processes may be able to stand alone as single product industries. However, since REI works with existing businesses as well, some of the products may be used to assist in the expansion of those existing businesses and thus add new jobs. REI also welcomes inquiries from investors. The financial needs of REI's clients are sometimes brokered with our contacts who are looking for investment opportunities. REI strives to make our clients the most successful they can be in their new business venture because it is only then that we too can become successful.



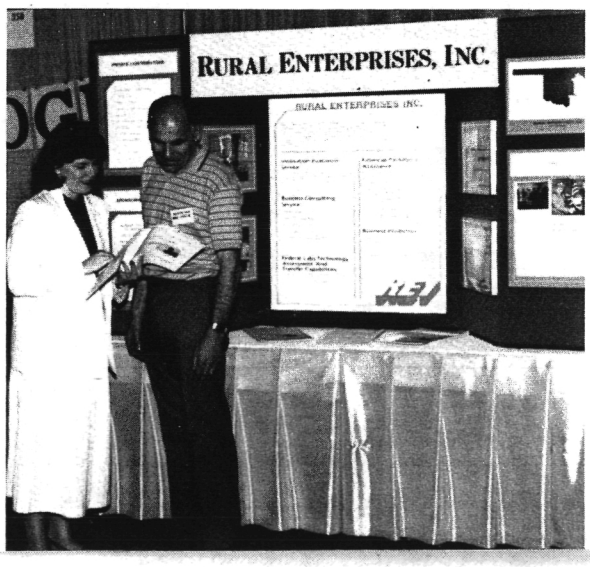
SPONSORING GOVERNMENT OFFICES

Department of Housing and Urban Development
U. S. Department of Commerce - Economic Development Administration
National Aeronautics and Space Administration
USDA - Office of Rural Development Policy
Oklahoma Cooperative Extension Service
Small Business Administration
U. S. Army Corps of Engineers

PRIVATE CONTRIBUTORS

Getty Refining & Marketing Co.
MAPCO, Inc.
Noble Foundation
Oklahoma Gas & Electric Co.
ONEOK
Phillips Petroleum Foundation, Inc.
Public Service Co. of Oklahoma
Rockwell International
Sarkeys Foundation
United States Steel
Willco Foundation, Inc.
W. K. Kellogg Foundation
Magnetic Peripherals, Inc.
Control Data Corporation

REI operates as a private, non-profit Oklahoma corporation. The public and private sector support that we have received in developing this industry and job creation vehicle have proven invaluable. REI's goal is to one day become self-sustaining by generating income from participation in our business development activities.



APPENDIX B

OCES NEWSLETTERS

COOPERATIVE EXTENSION SERVICE

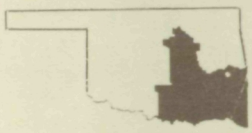
Technology Transfer Center Newsletter

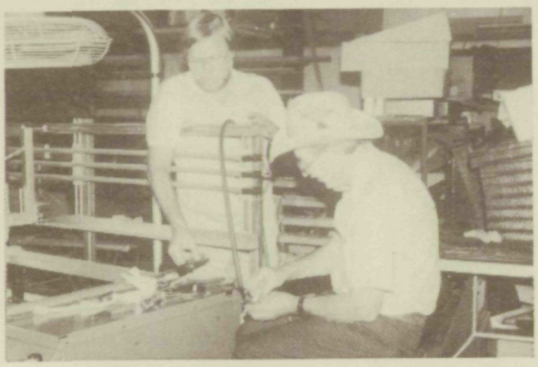
TECHNET

"Supporting Business Opportunities"

P.O. BOX 1713, DURANT, OK 74702 AUGUST, 1985

ENGLAND PLANS WAPANUCKA BRANCH





Monte England (left) with Harold Erichsen.

Meet Monte England, entrepreneur and businessman in Rural Enterprises' service area. Since childhood, England has possessed a drive to be his own boss. He started cashing in on pop bottles at age four. By age twelve, he worked at a bowling alley until 1:00 a.m. His first sales job was selling crawdads to local bait shops.

More recently, England has been selling his ideas to a national charity. The charity has approved using England's plastic dime creation for colleciton canisters in over 100,000 convenience stores nationwide. England realized the business potential in performing the assembly work and plastic vacuum forming processes needed to complete the canister project. This opportunity came to England while operating Cimarron Foundary in Rural Enterprises' Atoka incubator.

In March, 1985, England moved Cimarron Foundary out of the Atoka incubator and purchased an existing vacuum forming business, Benchmark Plastics in Tulsa. The new operation allows England to increase his business opportunities by completing plastic vacuum forming required by many of his clients rather than turning the work over to someone else. England plans to expand his plastics business into the Wapanucka, Oklahoma area in the near future.

England constantly searches for new marketable products to manufacture in his shop. One resource that England uses for new ideas is employee Harold Erichsen, designer for Benchmark Plastics. Erichsen has invented several new products. Marketing plans are being developed for the CYCLE HAUS, a plastic product developed to fill a storage and security need experienced by many motorcycle owners. An additional venture that has potential for England's plastics business is candy molds. Erichsen has made improvements on equipment used in candy mold manufacture. England plans to market both the molds and the improved equipment. Equipment prototypes will be shown at an industrial trade show in October, 1985.

Several other projects are in the works at Benchmark. With England's determination, it is certain that these and more new ideas will keep his business growing.

RETENTION AND EXPANSION OF EXISTING INDUSTRIES

Economic development entities have put a lot of effort into attracting outside industries to locate branch plants in rural communities. An often overlooked element in economic development is the RETENTION, EXPANSION, AND CREATION OF LOCAL FIRMS.

Statistics show that in Oklahoma more jobs are created through expansions of existing local businesses and industries than through large firms locating branch facilities in the Oklahoma communities.

Oklahoma Cooperative Extension Service, Rural Development Programs, are offering a new educational program to assist communities in economic development through RETENTION AND EXPANSION. The main thrust of the R&E Program is to help and support the existing business people in each community.

For more information about the R&E Program, contact your local County Extension Service or the OCES Technology Transfer Center.

RURAL AREAS MUST ADJUST TO FEDERAL CUTS

The federal role in rural development has changed forever, and state and local officials must adjust to less federal control, more local and state responsibility, and greater involvement of the private sector in development efforts.

This was the message delivered to the monthly meeting of the Albemarle Commission by the USDA's Rural Development Policy Director, Bill Phillips, Jr. The Albemarle Commission (formerly the Albemarle Regional Planning and Development Commission) is comprised of 24 local governments of northeast North Carolina involved in rural improvement.

"The days of endless federal funds are at an end," Phillips told the Commission, "but the extraordinary investment which those funds represent — in rural roads, health and environmental treatment centers, schools, dams, libraries, industrial parks, and other development necessities — is a strong foundation on which the future of rural America can be built." Phillips said local and state officials "must make the most of this endowment."

(SOURCE: Southern Rural Development Center CAPSULES, Vol. 5, No. 6, June, 1985)

GUIDELINES FOR REMANUFACTURING

Two recently published reports discuss various aspects of remanufacturing. One report examines the nature and extent of remanufacturing, the little-known sector of the economy where wornout products (called cores) are restored to like-new condition. The report sets up guidelines for the critical success factors as they apply to the original equipment manufacturer (OEM). A companion report treats the same subject but addresses remanufacturers other than the OEM's. The objective is to encourage additional remanufacturing ventures as a way to recapture energy, materials, labor, and capital — and to create jobs (at both the entry level and skilled-technician level), reduce solid wastes, lower prices for users, and return (frequently substantial) profits.

In a typical remanufacturing process, identical cores are grouped into production batches, completely disassembled and thoroughly cleaned. Component parts are replaced or refurbished, as necessary, to bring their performance at least to the level of the new product. Often the remanufactured product incorporates improvements which result from observation of the failed parts of the core. Attaining that high level of reliability is one of the greatest tests of a remanufacturer's skills.

The economic viability of remanufacturing lies in the recapture of a large fraction of the value added in the core at a low fraction of its original cost. Thus, a distinction can be made between the market value (that which someone would be willing to pay) of a core and its economic value (the salvageable materials, labor, energy, and capital costs). If the market value is significantly greater than the economic value, a profitable remanufacturing opportunity may exist.

(SOURCE: DOE — Office of Scientific and Technical Information — DE83016624/NAB — DE83016625/NAB)

TECHNOLOGY AVAILABLE

The technologies listed in this newsletter have been derived from research conducted by Federal Research Laboratories and are available for use by the private sector. For information about the technologies, contact the OCES Technology Center.

01085—INFLAMATION/FOAM/SHOTCRETE SYSTEM FOR RAPID CONSTRUCTION OF CIRCULAR ARCHES—The Construction Engineering Research Laboratory of the U.S. Army Corps of Engineers has demonstrated the feasibility of rapid construction of buildings using the IFS method. The process consists of using an inflatable test-like structure for a form. A six-inch layer of foam is sprayed over the form and is in turn covered with 3 inches of plastic shotcrete.

The prototype actually constructed was 26 feet wide by 32 feet long with a maximum height of 13 feet. It's arch shaped appearance makes it look like a concrete haystack. Roof creep (sagging) encountered in the prototype can be corrected with stiffening members. These structures are too crude in appearance for residences but may find use where ever rapid construction of durable buildings is required.

(SOURCE: Corps of Engineers, Special Report M-262, May 1979. Preliminary Evaluation: Rural Enterprises, Inc.)

02085—ELECTRIC-POWER SYSTEM—A simulator gives a quick overview of power system operation. It is useful in viewing total system performance for one day and shows different combinations of generation, storage and load componenets.

The simulator hardware consists of a display, a video monitor with keyboard input to a microprocessor, and a video monitor for the display of load curves and power generation. The simulator is also a useful planning tool for electric utilities, regulatory agencies, and laymen interested in understanding the basics of electric-power system operation.

(SOURCE: NASA Jet Propulsion Lab. Preliminary Evaluation: Rural Enterprises Inc.)

03085—ALINING LARGE CYLINDERS FOR WELDING—This new tooling consists of brackets that are bolted to the internal stiffening stringers on the cylindrical sections.

Special tooling alignes and holds internally-stiffened large-diameter cylindrical parts for welding. The tooling replaces large mandrels. The mandrel tooling was expensive and cumbersome and did not mate the parts precisely.

(SOURCE: George C. Marshall Space Flight Center. Preliminary Evaluation: Rural Enterprises Inc.)

04085—LOW-COST TELECONFERENCE SYSTEM—A proposed video teleconferencing system would display drawings, photographs, and text for conferees. Although the new system, called TELEDEMO, would not present live scenes from the conference locations, it would cost far less than conventional teleconference services.

With a parallel voice and data communications, TELEDEMO would allow two-way conferences between separated groups of people at data rates as low as 1,000 bits per second. Ordinary voice-grade telephone lines can easily handle this data rate. In contrast, full-video teleconferencing requires at least 1.5 megabits per second.

Each TELEDEMO conference site would include a display device (a television monitor or projection television) and one or more interactive devices (a joystick or graphics tablet), two telephone lines, a modem, and data-compression equipment. Optionally, a hard-copy device for film or paper, a video digitizer, and a video recorder could be included.

(SOURCE: NASA Jet Propulsion Lab Tech Brief, Spring 85.)

05085—COST UNCERTAINTIES OF ALTERNATIVE ENERGY TECHNOLOGIES—Quantitative methods have been developed to assess the cost and performance uncertainties of advanced electricity-generating technologies to allow more reliable comparisons between alternative technologies. Cost and performance uncertainties are major factors in such comparisons, and probability estimates help identify the lower-cost alternatives. Unlike deterministic approaches, which do not use statistical analysis for comparison, probabilistic methods are able to treat complete ranges of possible values for the key parameters, providing a more comprehensive basis for comparison.

(SOURCE: Argonne National Laboratory; DOE/NTIS DE81027137/NAB)

06085—HIGH-EFFICIENCY COMPRESSORS FOR REFRIGERATORS—Two models of a high-efficiency compressor have been manufactured in a pilot production run. The compressors are intended for low back-pressure applications — in particular, for domestic refrigerator/freezers. Although the units were based on previously manufactured models, many production process changes were necessary to accommodate the high-efficiency features.

Forty refrigerator/freezers were placed in residences for a 1-year field test. Compared with standard refrigerator/freezers, the units showed a 27 percent reduction in energy consumption for the smaller capactiy and a 15.6 percent reduction for the larger size.

(SOURCE: Oak Ridge National Laboratory, DOE/NTIS DE84005083/NAB)

07085—AUTOMATED ENERGY CONTROL IN PULP AND PAPER MILLS—A report describes the first part of an evaluation of the technical and economic feasibility of an automatic control system for an integrated pulp and paper mill. Emphasis is on reducing specific energy consumption.

The proposed system would employ one computer system for mill-wide optimization and a number of control computers for optimization of unit processes. Control functions would be divided into modular components throughout this computer hierarchy to facilitate project management and system utilization.

The report summarizes the principal findings and discusses the concepts of mill-wide optimization and the potential savings.

(SOURCE: DOE/NTIS DE83013888/NAB)

08085—WASTE-HEAT RECUPERATOR—A DOE report describes a high-efficiency heat recuperator that improves the thermal efficiency and fuel economy of industrial furnaces in the steel industry. (The recuperator system itself can be installed on other types of industrial furnaces.)

The recuperator consists of a metallic crossflow heat exchanger fabricated with a stainless steel core. Alternate layers of the heat exchanger are furnace brazed to form its rectangular structure.

The report presents a method for calculating the payback period for the system. Data obtained from three demonstration sites found a payback of 1 to 2 years and fuel economy improvements ranging from 17 to 37 percent when compared to furnaces without recuperators.

(SOURCE: TECLAB S15L43)

GUIDE TO BOOT STRAP BUSINESSES

All across the country, more and more Americans are seeking financial independence and personal satisfaction that owning and operating their own small business can bring. No matter where they live — rural areas, suburbs, or cities — they all have several things in common: independence, initiative, and ideas. Those ideas are the basis for the book, *Financial Independence*, provided by the Nissan Corporation.

For your free copy of *Financial Independence, The Nissan Guide to Bootstrap Businesses,* by Lil Borgenson, published by the Editors of *The Mother Earth News,* contact the OCES Technology Transfer Center.

DATES TO REMEMBER:

Boston-Edison Centennial Invention Competition
Deadline, October, 1985

10th Annual Government Contracting Symposium
Rose State College
Midwest City, OK
August 15, 1985

Wes Watkins New Product and Process Fair
Kiamichi Vo-Tech
Atoka, OK
March, 1986

Closed Loop/Ground Coupled Heat Pulp Installation Workshop
Engineering Extension —
Oklahoma State University
August 14-15, 1985
October 30-31, 1985
January 22-23, 1986

For Additional Information Contact:

Mr. Jack Frye, Area Specialist
OCES Technology Transfer Center
1515 W. Main
P.O. Box 1713
Durant, OK 74702-1713

(405) 920-0132

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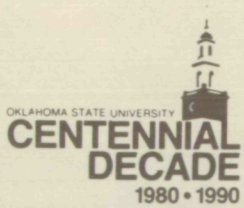


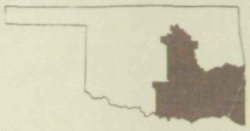
COOPERATIVE EXTENSION SERVICE

Technology Transfer Center Newsletter

TECHNET

"Supporting Business Opportunities"

P.O. BOX 1713, DURANT, OK 74702 SEPTEMBER, 1985



EXPO '85 — OKLAHOMA TRADE SHOW

EXPO '85, Oklahoma's largest business and industrial trade show, will take place September 17-19 at the Myriad Convention Center in Oklahoma City. The three day event will include 300 exhibitors, seminars and luncheons.

The trade show will address the problems and issues currently facing the Oklahoma business person. Anchoring the "Small Business Boulevard" portion of the exhibit area is the National Federation of Independent Business organization. The American Institute of Architects — Oklahoma Chapter will anchor the "Real Estate Row," while the "Industrial Road" pavillion will be sponsored by the Purchasing Management Association of Oklahoma City. Sponsorship in the "Ad Alley" category of business exhibits is being shared by the Public Relations Society of America's local chapter and the Oklahoma City Advertising Agency Council. In addition to these industrial avenues, the show format allows attendees to visit exhibits on Wall Street, Medical Mall, Silicon Valley and others.

Seminars and luncheons will be dedicated to the activities of the day. "Small Business Day" will be on September 17 with topics on marketing, SBA loans, Rural Enterprises, Inc.'s incubator program and more. Programs on advertising, public relations and corporate communications are planned for September 18, "Sales/Marketing/Advertising Day." Bryan Flanagan, Zig Zigler's number one sales trainer and motivation consultant, will be a special speaker on this day. "Industry Recognition Day" will be September 19. Programming by the U.S. Chamber of Commerce and others will address the problems of Sooner industry. Luncheon keynote speaker for this day will be Ed Foreman, business entrepreneur and self-made millionaire at age 26.

Oklahoma Business Magazine and Southwest Computer Conference are coordinating the event. Over 20 state associations of commerce and industry are also sponsors. For more information contact the OCES Technology Center.

NASA SPINOFF 1984

Research conducted by NASA in meeting aeronautical and space research goals
past quarter century has cut across a wide spectrum of scientific and technol
distance.

NASA Technologies have been transferred to the private sector in fields suc
medicine, public safety, transportation, industrial processes, construction,
machinery, food products, and the list continues to catalog length.

Collectively, these innovations represent a valuable contribution to American emp
ment, productivity, and lifestyle.

The "Spinoff" is a yearly publication by NASA that explains current NASA Technolog
which are producing direct public benefit. The "Spinoff" also gives a representat
selection of NASA Technologies currently utilized by businesses and industries in th
processes and products. Further, the "Spinoff" explains the NASA Technology Transf
Program and identifies contact sources for NASA information.

Rural Enterprises, Inc. of Durant, Oklahoma, contracts with NASA to transfer NAS
technologies in rural areas. Kerr Industrial Applications Center located at Southeastern
Oklahoma State University in Durant, is a NASA Technology Utilization Office.

For your free copy of "Spinoff 1984," contact the OCES Technology Transfer Center.

LOCAL INVENTOR HOPES TO HELP DROUGHT VICTIMS

A water well pump designed by a local inventor, Frank Slater, may help drought stricken
countries. The pump operates on electric energy provided by the sun, using
photovoltaic panels.

Slater, of Durant, Oklahoma, originally built the pump for use in the oil field. As oil field
work slowed down and energy costs accelerated, Slater realized other potential for the
pump. It became apparent that the pump could be used effectively in pumping water for
agricultural purposes.

Several contacts have been made with USA For Africa, but right now all the money
raised by USA For Africa is being used for food. "If the emphasis changes to helping
Africans to help themselves, then we have provided a long term solution. Africans can
feed themselves by drilling wells and using the Solray pump to bring the water to the
surface. They can grow whatever they want," Slater said.

Africa is not the only market Slater hopes to attract. The pump was designed to replace
the windmill, and studies show that there are about 1.5 million windmills worldwide.

ANNUAL CYCLE ENERGY SYSTEM FOR HOME USE

Energy used for heating and cooling residential buildings accounts for more than one-
fourth of the total energy used in the United States today. Much of the existing housing
was built when energy was readily available and inexpensive; therefore, little concern
was directed to developing efficient heating and cooling systems. The nation's energy
situation has changed, however, and it is now imperative that alternative home heating
and cooling systems that minimize energy consumption be developed.

One alternative under development by the Department of Energy (DOE) is the Annual
Cycle Energy System (ACES), an energy-efficient system designed not only to heat and
cool living space, but to provide domestic hot water as well. ACES takes advantage of
the yearly weather cycle in much of the United States, in which the heating required to
warm residences in the winter (and provide hot water year-round) and the cooling re-
quired to air-condition them in summer are fairly well-balanced.

DOE/CS-0087

TECHNOLOGY AVAILABLE

The technologies listed in this newsletter have been derived from research conducted by Federal Research Laboratories and are available for use by the private sector. For information about the technologies, contact the OCES Technology Center.

01095—CONNECTOR, SELF-LOCKING—A self-locking connector mechanism has been developed which is spring-loaded into a normally locked position. The mechanism resists vibration, automatically compensates for wear, and exhibits no backlash when the parts are seated. Vibrations will not loosen the connector even if the installer fails to tighten the nut.

(SOURCE: Marshall Space Flight Center, MFS-19716. Preliminary Evaluation: Rural Enterprises, Inc.)

02095—BEARING REMOVAL TOOL—A portable air-powered tool enables rapid bearing replacement with minimum effort. The air-powered device cuts away retaining lips on one side of a bearing in preparation for removal of the bearing from an assembled structure. The tool makes it possible to replace the bearings without having to disassemble the structure. It eliminates costly and time-consuming disassembly prior to conventional machining and pressing out of spherical bearings.

(SOURCE: Johnson Space Center, MSC-20337. Preliminary Evaluation: Rural Enterprises, Inc.)

03095—EXPLOSIVE PUFFING DEHYDRATION—A procedure using explosive puffing for the dehydration of fruits and vegetables was developed at the United States Department of Agriculture, Eastern Region Research Center. One advantage of this dehydration technique is that the dried product can be rehydrated quickly and easily. Carrot cubes dehydrated by this process can be reconstituted and served after five minutes of cooking as compared to 45 minutes for conventionally dehydrated carrot cubes.

This dehydration technique has been demonstrated successfully with carrots, white potatoes, sweet potatoes, beets, rutabagas, peppers, celery, apples, and blueberries. When the product is reconstituted, it closely resembles the original condition of the fruit or vegetable. The explosive puffed dehydration process results in a product with the following characteristics: Excellent flavor and color, long shelf life, storage at ambient temperatures, low storage and transportation cost and durability. The continuous process nature of the explosive puffing dehydrating system provides an economic advantage over earlier batch dehydration processes.

(SOURCE: USDA Agriculture Research Service)

04095—SCREW-RETAINING ALLEN WRENCH—A wire spring at the end of an Allen wrench holds a screw while it is inserted or removed. The tool can be used with Allen-head screws in cramped spaces where there is little or no room for the fingers to hold the fastener while it is turned by the wrench. The spring lies in a groove in the wrench. A crimp near the end of the spring protrudes slightly from the groove. The opposite end of the spring is anchored in a transverse hole through the wrench.

(SOURCE: NASA's Jet Propulsion Laboratory, JPL NPO-16275.)

05095—HEATING SYSTEM OPTIONS FOR ENERGY-EFFICIENT HOMES—A comprehensive review presents an analysis of the best ways of meeting the heating requirements of newly-constructed residential buildings that have been designed for high-energy efficiency. The review begins with the current trends in building design with topics ranging from air infiltration and passive-solar gain to thermal storage and energy-flow controls. This is followed by an analysis of the space-heating requirement of four types of houses in six geographical locations, their Domestic Hot Water requirements, and the energy costs of using various fuels at their relative prices.

A discussion is then provided of the many system and equipment options available for supplying space and Domestic Hot Water heating. Included are a variety of electric-resistance heaters, gas-fired heaters, heat pumps and storage devices, and solar heaters.

The last section presents a seven-step system-selection process for choosing the best system with the lowest total owning and operating costs.

(SOURCE: Brookhaven National Laboratory, DOE/NTIS DE84000441/NAB)

06095—PRODUCTION OF DEFATTED SOYBEAN PRODUCTS BY SUPERCRITICAL FLUID EXTRACTION—The raw grassy and bitter principles in soybeans are reduced to acceptable levels for purposes of human consumption without significant degradation of the nutritional properties. This result is achieved by a lipid extraction process in which raw soybean material is treated with carbon dioxide under carefully controlled supercritical conditions. Of particular importance are the moisture content of the bean material as well as the pressure, temperature, and contact time ofthe carbon dioxide extractant.

(SOURCE: USDA Inventions Available for Licensing, Jan. 84.)

07095—METHOD FOR REDUCING SODIUM CONTENT AND SIMULTANEOUSLY INCREASING POTASSIUM CONTENT OF A FOOD—The sodium content of a food is reduced and the potassium content simultaneously increased by a process wherein an aqueous solution of a sodium-containing food and an aqueous solution containing potassium ions are circulated on opposite sides of a cation exchange membrane for a time and at a rate sufficient to exchange at least a portion of the sodium and potassium ions.

(SOURCE: USDA Inventions Available For Licensing, 1984)

08095—SEED INJECTOR PLANTING TOOL—A method and an apparatus are described for planting tree seeds without removing or substantially disturbing the organic soil layer. The apparatus is portable and hand-operated, and utilizes a tapered structure near its base to form a hole which will allow the plant cotyledons to surface with minimal resistance.

(SOURCE: USDA Inventions Available For Licensing, 1984)

09095—DECARBAMOYLSULFONATE TANNING AGENT—A new tanning agent, isophorone dicarbamoylsulfonate, is provided for tanning cattle hides and sheepskins. A white leather which does not discolor with exposure to sunlight and which has good fill and tensile strength is produced. The tanning agent is also effective for retanning slack chrome-tanned and zirconium-tanned cattle hides and sheepskins.

(SOURCE: USDA Inventions Available For Licensing, 1984)

10095—PROCESS AND APPARATUS FOR DRYING PAPER AT ELEVATED TEMPERATURE AND PRESSURE—A method and apparatus for treating a wet web in the production of paper, cardboard or the like wherein the temperature of the web is increased to above 100 C. without the vaporization of the water in the web prior to the beginning of the drying cycle.

(SOURCE: USDA Inventions Available For Licensing, 1984)

BOOTSTRAP BUSINESS GUIDE WELL RECEIVED

In the August issue of TECHNET, we told you of a free publication titled "Financial Independence," the Nissan Guide to Bootstrap Business. The response to the publication has been excellent. We still have some copies left. If you would like additional copies, or would like Your Free Copy, contact the Technology Transfer Center.

DATES TO REMEMBER:

Wes Watkins New Product and Process Fair
Kiamichi Vo-Tech
Atoka, OK
April 2,3,4, 1986
Entry Deadline February 14, 1986

Closed Loop/Ground Coupled Heat Pump Installation Workshop
Engineering Extension —
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CENTENNIAL DECADE
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COOPERATIVE EXTENSION SERVICE

Technology Transfer Center Newsletter

TECHNET

"Supporting Business Opportunities"

P.O. BOX 1713, DURANT, OK 74702 JULY, 1985

RURAL ENTERPRISES ELECTS NEW BOARD MEMBERS

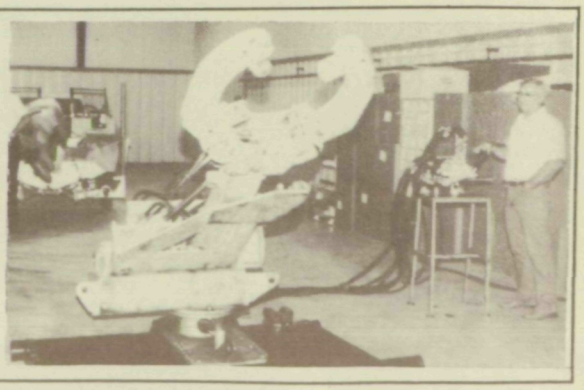
Rural Enterprises, Incorporated's membership elected the industrial development center's Board of Directors at the Annual Meeting held June 18, 1985, in Durant, Oklahoma. Re-elected to the board were officers Raymond James, Ada, Chairman; Bob Jackson, Tulsa, Vice Chairman; James Hargrove, Prague, Secretary; Jack Thompson, Ardmore, Treasurer; and board members Dr. Fern Green, Oklahoma City; Dr. Chuck Hopkins, Stillwater; Pat Thomas, Wilburton; David Norris, Broken Bow; Larry Briggs, Holdenville; and Bill Young, Durant.

Special presentations highlighted this year's regular annual meeting agenda. Outgoing Chairman of the Board, Bill Young, and two-year board member Jean Warner, Stillwater received framed letters of appreciation from Congressman Wes Watkins for their outstanding service in support of economic development and the creation of new private sector jobs in Southeastern and South Central Oklahoma. Steve Hardy, Rural Enterprises' President, gave special recognition to those outgoing board members plus Fred Smith, Wewoka, and Bob Haney, McAlester, who also completed their term of service as board members.

Three new board members were elected. Ken Giles, McAlester; Jan Montgomery, Hugo; and Tom Gray, Shawnee; were unanimously elected to serve a two year term of service as Rural Enterprises, Inc. board members.

Thirty-five people attended the annual meeting and were given a tour of the industrial incubator located in the Rural Enterprises' complex. Staff members demonstrated ten active projects currently under development. Concluding the meeting was the presentation of Rural Enterprises' Annual Progress Report for 1984-85.

If you are interested in Rural Enterprises' services and accomplishments for the year, a copy of the report may be obtained by writing Ricki Jackson, Special Projects Coordinator, Rural Enterprises, Inc., P.O. Box 1335, Durant, OK 74702-1335.



TECHNET — T^2 CENTER NEWSLETTER

Support of the OCES Technology Transfer Center Newsletter has been very good since the first issue. To better describe the thrust of the publication, the name of the newsletter is bing changed to **TECHNET,** which stands for Technology Network.

The OCES T^2 Center networks inventors, engineers, businesses, entrepreneurs, and the private sector with federal, state, and local sources of assistance to solve technology problems.

GETTING YOUR SHARE OF GOVERNMENT BUSINESS

Do you know how to sell to the government? Are you on the government bidders mailing list? The answer to these questions will be discussed at a workshop to be held Thursday, July 25, at the Francis Tuttle Vo-Tech Center in Oklahoma City!

The meeting is a cooperative effort of the Vo-Tech and Tinker Air Force Base Small Business Utilization Office. The workshop is designed to provide the businessperson with procedures and information needed to participate in federal contracting opportunities, primarily relating to weapon systems, spare parts, and services.

The workshop will also include sessions on how to fill out the bid or proposal and administrative actions taken after a contract is awarded.

For more information and registration information, contact: Adult Education, Francis Tuttle Vo-Tech Center, 1277 North Rockwell, Oklahoma City, OK 73142.

10TH ANNUAL GOVERNMENT CONTRACTING SYMPOSIUM

Businesses, local government entities, and business development organizations are invited to participate in a government contracting symposium to be held August 15, at Rose State College, Midwest City, Oklahoma. The symposium is designed to assist small disadvantaged and minority owned businesses to better understand government contracting operations.

The one day program will consist of workshops, panels, counseling, and trade fair activities intending to explain and clairfy government contracting procedures for the small business entrepreneur.

Representatives of several Department of Defense contracting agencies will be present to visit with attendees.

There is no charge for participation in the symposium, other than the purchase of luncheon tickets at $10.00 per person. There will be a modest charge for those businesses and agencies exhibiting in the trade fair portion of the symposium.

Attendance at the 1984 symposium exceeded 650 people. According to David Barghols of Tinker Air Force Base, "this is a tremendous opportunity for exchange of information between the government purchasing entities and the small, disadvantaged, and minority owned suppliers.

If you are interested in the symposium, contact in writing:

Oklahoma City ALC
Attn: BC/Barghols
Tinker AFB, OK 73145-5990

TECHNOLOGY AVAILABLE

The technologies listed in this newsletter have been derived from research conducted by Federal Research Laboratories and are available for use by the private sector. For information about the technologies, contact the OCES Technology Center.

01075—AIR GUIDE FOR SHEET-METAL GRINDER—A small trough attached to a hand-held grinder directs cooling air to the grinding wheel and workpiece. The cooling air reduces thermal distortion of the workpiece due to localized frictional heating. It is particularly useful when grinding sheet metal. The attachment alters the direction of airflow from a port on the motor housing. The flow created by the fanlike action of the rotating motor cools the sheet metal. It thus reduces or eliminates the need to slow down grinding or to temporarily stop grinding to allow the sheet to cool.

(SOURCE: George C. Marshall Space Flight Center, MFS-19788. Preliminary Evaluation: Rural Enterprises, Inc.)

02075—PORTLAND-CEMENT PLASTER CONSTRUCTION—The Structures Laboratory and Construction Technology Laboratories of the U.S. Army Corps of Engineers have investigated deficiencies in portland-cement plaster. After visiting military and civilian projects in the Southern United States and Middle East, defects were noted, causes identified and specific recommendations made. Areas covered were design, batching plaster, workmanship and inspection. Results included recommendations to change eight of the Corps Guide Specifications.

This work can serve as a guide to concrete plaster contractors as well as local governments and companies contracting the projects to help avoid cracking, color variations and blemishes.

(SOURCE: U.S. Army Corps of Engineers Technical Report SL-84-10, June 1984. Preliminary Evaluation: Rural Enterprises, Inc.)

03075—CABLE INSULATION WRAPPER—The winding of magnetic coils with superconducting cable requires that the cable be wrapped with a thin layer of insulation, such as plastic tape, prior to the winding. Typically the cable is wrapped separately and stored on the reel for later use with coil-winding machines. Because of the amount of handling in this process, the risk of damage to the cable or entrapment of dirt and metal chips around the cable is high, which can lead to short circuits or changes in the dielectric characteristics in the wound coil. A wrapping system designed to work with the coil-winding machine eliminates these problems by combining the wrapping and winding processes into one.

(SOURCE: Lawrence Berkeley Laboratory: NTIS DE 83013167/NAB; Licensing opportunity)

04075—SOLAR-CELL-MANUFACTURING SYSTEM—The cost of manufacturing solar arrays can be minimized by using polyimide-ribbed substrates together with silver-plated coils of low-expansion nickel/iron ribbon welded on solar cells. The ribbon can be easily silver-plated or silver-clad without burrs. Because the thermal-expansion coefficient of the ribbon is well-matched to that of silicon, the spot welds will not load one another under thermal stress.

(SOURCE: NASA MFS-25483/TN)

05075—PARABOLIC SOLAR COLLECTORS—A paper presents a tutorial overview of point-focusing parabolic reflectors for solar-energy collectors. The optical and thermal characteristics of such collectors are discussed in detail. Data representing typical collector effieiencies are presented, and the importance of balancing collector cost with concentrator quality is argued through the development of a figure-of-merit for the collector.

Various types of two-axis-tracking collectors are described, as are two forms of fixed-mirror collectors with articulating receivers.

(SOURCE: NASA's Jet Propulsion Laboratory. NPO-15674/TN)

06075—PRACTICAL WAYS OF REDUCING ENERGY COSTS—A compilation describes 20 successful projects accomplished under the sponsorship of the U.S. Department of Energy's Appropriate Technology Small Grants Program. The subjects are divided into the following categories: (a) saving energy and cutting costs at home, (b) developing community resources, (c) conserving energy in the workplace, and (d) discovering renewable resources on the farm.

An insulative brick, 30 percent lighter yet 4 times more insulative than conventional bricks, starts the section on saving energy at home. The section on developing community resources features award-winning greenhouses built by high-school students. Money-saving refrigeration that pumps in cold air from the outside in winter months begins the section on energy conservation in the workplace. Finally, wind-propelled generators to produce electricity on farms can be put to good use to reduce the farmers' utility bills.

(SOURCE: DOE/CE/150951/NAB)

07075—MAGNETIC MEASUREMENTS IN BOREHOLES—A magnetic detection apparatus based on superconducting quantum interference devices (SQUID's) determines the direction of a hydrofracture in rock adjacent to a borehole. The apparatus is used in the development of hot dry rock (HDR) geotherman energy. A deep borehole is drilled into a HDR zone and is flooded under high pressure to create a hydrofracture — a fissure extending more or less in a single direction. A second borehole is then drilled about 200 m from the first so as to intersece the hydrofracture. Water is pumped down one borehole to flow through the cracks to the second borehole, becoming heated by the HDR and emerging as steam to run an electric powerplant.

(SOURCE: DOE/TIC/EG 83/201; Licensing opportunity.)

09075—IMPROVED DOWNHOLE STEAM INJECTOR—An improved downhole steam injector has a number of built-in features for converting water into steam for tertiary oil recovery. More efficient injector design means more efficient transfer of steam to the well and, therefore, more oil recovery.

One of the features is the water orifice slanted approximately 45° to the axis of the injector body. This arrangement imparts swirling motion to the water as it moves between the injector walls. The swirling motion causes the water to absorb more heat, at the same time increasing the cooling of the injector walls. Spiral spacers guiding the water between the inner and middle injector sleeves also contribute to the heat exchange. This reheated water sprays through the holes in the annular water injector where it is converted to steam.

(SOURCE: DOE/TIC/EG-84/005; Licensing opportunity.)

10075—LOW-COST MODULAR PHOTOVOLTAIC INSTALLATION—A photovoltaic array field, consisting of three 10 kW building blocks taken from a design developed in a preceding phase of this program, was evaluated in terms of balance-of-system (BOS) and site-specific design costs associated with the installation of this block concept. The results were intended to show the cost-effectiveness and technical attributes of this test-bed array field.

The analysis of the cost of the first-time installation was based on the actual construction contractor's price and the costs of separately procured structural materials. It also included the cost attributable to the site supervisor during the installation.

(SOURCE: SAND 83-7027/NAB)

NEW GUIDE IDENTIFIES RESOURCES TO AID SMALL BUSINESS INNOVATORS

More than 50 Federal and 85 State government offices that offer assistance to smaller businesses in bringing new technologies to market are specifically identified. The Guide is written for both individual companies and State and local government economic development planners.

The *Guide to Innovation Resources and Planning for the Smaller Businesses* has two basic sections. The first examines the many steps in the innovation process and the skills and resources needed. The second section identifies a wide range of resources (Federal, State, and private) available to assist the smaller business in areas such as financing, information gathering, and management. The capabilities of these resources are summarized and contact phone numbers and addresses given. Each resource has been identified by the state of the innovation process to which it applies.

For more information contact Technology Center.

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July 25, 1985

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August 15, 1985

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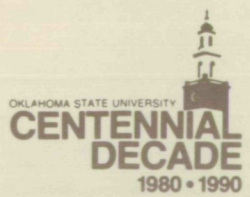

C. Are you interested in doing metal fabrication work in? (Check appropriate ones)

1. Metal Fabrication

a. Shearing
   Rotary _____
   Squaring _____

b. Pressing
   Ironworker _____
   Press brake _____
   Forging or drop hammer _____

c. Welding & Flame Cutting
   Spot welding _____
   Pattern torch _____
   Welding, arc _____
   Welding, heli-are _____

d. Does your interest in contract or sub-contract include other types? _____ If so decribe-_____
_____

2. Parts Machining

Does your interest in parts machining contract or sub-contract work include:

a. Sawing
   Cut off _____
   Contour, band _____

b. Drilling
   Drill press, conventional _____
   Drill press, numerical controlled _____
   Drill press, radial arm _____

c. Milling
   Conventional _____
   Numerical controlled _____

d. Turning
   Engine lathe _____
   Turrette lathe, conventional _____
   Turrette lathe, numerical controlled _____
   Screw machines, automatic _____

e. Grinding
   Grinder, cylindrical _____
   Grinder, surface _____
   Grinder, tool and cutter _____
   Grinder, centerless _____
   Grinder, jig _____

f. Other Maching
   Jig borer _____
   Miscellaneous _____

Does your interest in component assembly contract or sub-contract work include:

3. Component Assembly

a. Riveting _____
b. Bonding _____
c. Other assembly _____

Does your interest in electronics contract or sub-contract work include:

4. Electronics

a. Circuit board fabrication _____
b. Wire harnesses _____
c. Other electronics _____

Does your interest in finishing contract or sub-contract work include:

5. Finishing

a. Heat treating _____
b. Metal cleaning _____
c. Electroplating _____
d. Metalic coating _____
e. Phosphate coating _____
f. Chromate conversion coating _____
g. Painting _____
h. Rust preventative _____
i. Polishing _____
j. Barrel finishing _____
k. Vibratory finishing _____
l. Other finishing _____

Does your interest in testing contract or sub-contract work include:

6. Testing

a. Mechaincal size inspection _____
b. Mechinical strength inspection _____
c. X-ray _____
d. Electrical testing _____
e. Magnaflurx _____
f. Zyglo _____
g. Ultrasound _____

Does your interest in packaging contract or sub-contract work include:

7. Packaging

a. To Military specifications _____
b. To Commercial specifications _____
c. Other packaging equipment _____

Does your interest in plastics contract or sub-contract work include:

8. Plastics

a. Injection molding _____
b. Vacuum forming _____
c. Blow molding _____
d. Fiberglass _____
e. Extruding _____
f. Other plastic

APPENDIX D

NASA TECHNOLOGY EVALUATIONS

APPENDIX C

IDI SECONDARY QUESTIONNAIRE

Company name:

Principal Contact:

Phone:

SICs:

In a recent survey that was conducted by Congressman Wes Watkins, you indicated that you:

A. Have excess capacity in: (check appropriate ones)

1. Facilities _____
2. Machinery & Equipment _____
3. Human Resources _____

B. Are currently doing contracting or sub-contracting work in: (check appropriate ones)

1. Metal Fabrication _____
2. Parts Machining _____
3. Component Assembly _____
4. Electronics _____
5. Finishing _____
6. Testing _____
7. Packaging _____
8. Plastics _____

C. Are interested in contracting or sub-contracting work in: (check apropriate ones)

1. Metal Fabrication _____
2. Parts Machining _____
3. Component Assembly _____
4. Electronics _____
5. Finishing _____
6. Testing _____
7. Packaging _____
8. Plastics _____

d. Turning

Engine lathe	_____
Turrette lathe, conventional	_____
Turrette lathe, numerical controlled	_____
Screw machines, automatic	_____

e. Grinding

Grinder, cylindrical	_____
Grinder, surface	_____
Grinder, tool and cutter	_____
Grinder, centerless	_____
Grinder, jig	_____

f. Other Maching

Jig borer	_____
Miscellaneous	_____

Does your interest in component assembly contract or sub-contract work include:

3. Component Assembly

a. Riveting	_____
b. Bonding	_____
c. Other assembly	_____

Does your interest in electronics contract or sub-contract work include:

4. Electronics

a. Circuit board fabrication	_____
b. Wire harnesses	_____
c. Other electronics	_____

Does your interest in finishing contract or sub-contract work include:

5. Finishing

a. Heat treating	_____
b. Metal cleaning	_____
c. Electroplating	_____
d. Metalic coating	_____
e. Phosphate coating	_____
f. Chromate conversion coating	_____
g. Painting	_____
h. Rust preventative	_____
i. Polishing	_____
j. Barrel finishing	_____
k. Vibratory finishing	_____
l. Other finishing	_____

Does your interest in testing contract or sub-contract work include:

6. Testing

a. Mechaincal size inspection _____
b. Mechinical strength inspection _____
c. X-ray _____
d. Electrical testing _____
e. Magnaflurx _____
f. Zyglo _____
g. Ultrasound _____

Does your interest in packaging contract or sub-contract work include:

7. Packaging

a. To Military specifications _____
b. To Commercial specifications _____
c. Other packaging equipment _____

Does your interest in plastics contract or sub-contract work include:

8. Plastics

a. Injection molding _____
b. Vacuum forming _____
c. Blow molding _____
d. Fiberglass _____
e. Extruding _____
f. Other plastic

5. Grinders
   - Grinder, cylindrical _____
   - Grinder, surface _____
   - Grinder, tool and cutter _____
   - Grinder, centerless _____
   - Grinder, jig _____

6. Miscellaneous
   - Jig borer _____
   - Other Miscellaneous equipment _____

C. Component Assembly

What type of equipment do you have for component assembly?
1. Riveting _____
2. Bonding _____
3. Other _____

D. Electronics

What type of electronics equipment do you have?
1. Circuit board fabrication _____
2. Wire harnesses _____
3. Other _____

E. Finishing

What type of finishing equiment do you have?
1. Heat treating _____
2. Metal cleaning _____
3. Electroplating _____
4. Metalic coating _____
5. Phosphate coating _____
6. Chromate conversion coating _____
7. Painting _____
8. Rust preventative _____
9. Polishing _____
10. Barrel finishing _____
11. Vibratory finishing _____
12. Other _____

F. Testing

What type of testing equipment do you have?
1. Mechaincal size inspection _____
2. Mechinical strength inspection _____
3. X-ray _____
4. Oscilloscopes _____
5. Magnaflurx _____
6. Zyglo _____
7. Ultrasound _____

G. Packaging

What type of packaging equipment do you have?

1. To Military specifications _____
2. To Commercial specifications _____
3. Other packaging equipment _____

H. Plastics

What type of equipment do you have for plastics?

1. Injection molding _____
2. Vacuum forming _____
3. Blow molding _____
4. Fiberglass _____
5. Extruding _____

A: 3. (Check appropriate ones)

In what areas are the excess workers trained as:

Machinists _____
Electronics technicians _____
Other technicians _____
Assemblers _____
Machine Operators _____
Welders _____
Painters _____

B. (Check appropriate ones)

1. Metal Fabrication

Does your current metal fabrication contract or sub-contract include:

a. Shearing
   Rotary _____
   Squaring _____

b. Pressing
   Ironworker _____
   Press brake _____
   Forging or drop hammer _____

c. Welding & Flame Cutting
   Spot welding _____
   Pattern torch _____
   Welding, arc _____
   Welding, heli-are _____

d. Does your current contract or sub-contract include any other types? _____ If so decribe-_____
_____

2. Parts Machining

Does your current parts machining contract or sub-contract include:

a. Sawing
   Cut off _____
   Contour, band _____

b. Drilling
   Drill press, conventional _____
   Drill press, numerical controlled _____
   Drill press, radial arm _____

c. Milling
   Conventional _____
   Numerical controlled _____

d. Turning
   Engine lathe _____
   Turrette lathe, conventional
   Turrette lathe, numerical controlled _____
   Screw machines, automatic _____

e. Grinding
   Grinder, cylindrical _____
   Grinder, surface _____
   Grinder, tool and cutter _____
   Grinder, centerless _____
   Grinder, jig _____

f. Other Maching
   Jig borer _____
   Miscellaneous _____

Does your current component assembly contract or sub-contract include:

3. Component Assembly

a. Riveting _____
b. Bonding _____
c. Other assembly _____

Does your current electronics contract or sub-contract include:

4. Electronics

a. Circuit board fabrication _____
b. Wire harnesses _____
c. Other electronics _____

Does your current finishing contract or sub-contract include:

5. Finishing

a. Heat treating _____
b. Metal cleaning _____
c. Electroplating _____
d. Metalic coating _____
e. Phosphate coating _____
f. Chromate conversion coating _____
g. Painting _____
h. Rust preventative _____
i. Polishing _____
j. Barrel finishing _____
k. Vibratory finishing _____
l. Other finishing _____

Does your current testing contract or sub-contract include:

6. Testing

a. Mechaincal size inspection _____
b. Mechinical strength inspection _____
c. X-ray _____
d. Electrical testing _____
e. Magnaflurx _____
f. Zyglo _____
g. Ultrasound _____

Does your current packaging contract or sub-contract include:

7. Packaging

a. To Military specifications _____
b. To Commercial specifications _____
c. Other packaging equipment

Does your current plastics contract or sub-contract include:

8. Plastics

a. Injection molding _____
b. Vacuum forming _____
c. Blow molding _____
d. Fiberglass _____
e. Extruding _____
f. Other plastic

July 1, 1985 - September 30, 1985

PRELIMINARY EVALUATIONS

	PRODUCT NAME	CO-INVENTOR	REF2
	Rolling-Contact Rheostat	NASA's Jet Propulsion Laboratory	TBSU85
	Incrementally Variable High-Voltage Supply	Marshall Space Flight Center	TBSU85
	Low-Voltage Protection for Volatile Computer Memories	NASA's Jet Propulsion Laboratory	TBSU85
	Commutating Permanent-Magnet Motors at Low Speed	Marshall Space Flight Center	TBSU85
	Reed-Switch Position Indicator	John F. Kennedy Space Center	TBSU85
	Processing of Image Data by Integrated Circuits	NASA's Jet Propulsion Laboratory	TBSU85
	Monitoring Trace Gases in the Atmosphere	NASA's Jet Propulsion Laboratory	TBSU85
	Airborne DIAL System for Remote Tropospheric Sensing	Langley Research Center	TBSU85
	Optical Amounts for Cryogenic Beam Splitters	Goddard Space Flight Center	TBSU85
	Estimating Antenna Shape From Fair-Field Measurements	NASA's Jet Propulsion Laboratory	TBSU85
	Improved Thermal-Diffusivity-Measuring Apparatus	NASA's Jet Propulsion Laboratory	TBSU85
	Measuring Moisture in Sealed Electronic Enclosures	Lyndon B. Johnson Space Center	TBSU85
	Diffusely Reflecting Paints Containing TFE	Goddard Space Flight Center	TBSU85
	Intercalated-Carbon Low-Resistivity Fibers	NASA's Jet Propulsion Laboratory	TBSU85
	Ion Implantation Improves Bearing-Surface Properties	Marshall Space Flight Center	TBSU85
	Microfissuring in Electron-Beam-Welded Nickel Alloy	Marshall Space Flight Center	TBSU85
	Production Process for Strong, Light Ceramic Tiles	Lyndon B. Johnson Space Center	TBSU85
	End Restraints for Impact Energy Absorbing Tube Specimens	Langley Research Center	TBSU85
	Testing Machine for Biaxial Loading	Lyndon B. Johnson Space Center	TBSU85
	Force Sensor for Large Robot Arms	NASA's Jet Propulsion Laboratory	TBSU85
	Tabs Reduce Helicopter Blade Vibrations	Ames Research Center	TBSU85
*	Universal Cable Brackets	George C. Marshall Space Flight Center	TBFA84
*	Aircraft Control Position Indicator	Langley Research Center	TBFA84
*	Static Suppressing Optical Paint	NASA's Jet Propulsion Laboratory	TBSP85
*	Inflatable Column Structure	NASA's Jet Propulsion Laboratory	TBSP85
*	Screw Retaining Allen Wrench	NASA's Jet Propulsion Laboratory	TBSP85
*	Low Friction Joint for Robot Fingers	NASA's Jet Propulsion Laboratory	TBSU85
*	Automated Coal Mining System	NASA's Jet Propulsion Laboratory	TBSU85
*	Hybrid Wastewater Treatment System Using Anaerobic Micro-organisms and Reed	National Space Technology Laboratory	TECTRA
*	Biological Control of Water Pollution	National Space Technology Laboratory	TECTRA
	Brace, Molded, Composite, Orthopedic	Los Alamos National Laboratory	TECTRA
	Program, Computer, Translation	Johnson Space Center	TECTRA
	Liferaft, Inflatable, Nontippable, Reflective	Johnson Space Flight Center	TECTRA
	Adhesive, High Temperature	Langley Research Center	TECTRA
	Welder, Portable Toroid, Plastic	Langley Research Center	TECTRA
	Guy Cable, Tension Measurement	Rome Air Development Center	TECTRA
	Sewage, Biological Treatment	National Space Technology Laboratory	TECTRA

* Secondary Evaluations

APPENDIX E

NASA PROJECT UPDATES

QUARTERLY PROJECT UPDATE

REPORT PERIOD: July 1, 1985 - September 30, 1985

PROJECT TITLE:	Corazonix Corporation (located in McAlester incubator)
PROJECT NUMBER:	1205
PROJECT STATUS:	Active
ORIGINATION DATE:	10-16-84
ORIGINAL EMPLOYEES:	1
EMPLOYEES AT END OF REPORT PERIOD:	6
SOURCE OF REFERRAL:	

PROJECT DESCRIPTION:

Research and development of biomedical instrumentation.

PROJECT OBJECTIVE:

To develop and market biomedical instrumentation and to operate as a biomedical Research and Development firm. REI's objective is to assist in furnishing the incubator, assist in any marketing objectives that the company may have, and to be a source for technical data, i.e., NASA, SBIR, etc.

ACTIVITY DURING REPORTING PERIOD:

1. Two additional employees were hired by Corazonix.

2. Dr. David Albert presented a 30 second forum at the Oklahoma Enterprise Forum, Tulsa, Oklahoma. This presentation generated considerable interest from investors and consultants.

3. Corazonix is planning to locate a manufacturing plant and possibly a marketing company in McAlester. Venture capital financing has been obtained.

4. Two new products, "Vita-Trak" and "Dop-Op" are being developed.

5. Problem statements were submitted to RTI at NASA on the Implantable Drug Infusion System.

6. Citations from the NASA RECON database were received and forwarded to Corazonix.

7. Corazonix research arm has moved into their new location in Oklahoma City. The business will remain in the McAlester incubator until January, 1986.

8. REI continues to assist Corazonix with patent information and NASA program solicitations.

RESOURCES UTILIZED: Rural Enterprises' Staff

FINANCING:

Prepared By: Kathy Hulse

QUARTERLY PROJECT UPDATE

REPORT PERIOD: July 1, 1985 - September 30, 1985

PROJECT TITLE: Delight Systems
PROJECT NUMBER: 1204
PROJECT STATUS: Active
ORIGINATION DATE: 10-16-84
ORIGINAL EMPLOYEES: 0
EMPLOYEES AT END OF REPORT PERIOD: 0
SOURCE OF REFERRAL:

PROJECT DESCRIPTION:

Portable stage lighting system.

PROJECT OBJECTIVE:

To complete the product design and manufacturing costing and manufacturing process; to then build a number of units and test market them in the Tulsa, Oklahoma City and Dallas markets. If the test market proves successful then some type of production in the Durant area or in the Rural Enterprises, Inc.'s incubator will be done.

ACTIVITY DURING REPORTING PERIOD:

1. Research results were positive and indicated a profitable market niche exists for an improved Delight Systems product.

2. Information collected from shops in Oklahoma City and Dallas indicate a need to modify the prototype by adding a low voltage, foot-controlled switch and a mounting bracket for a standard instrument stand.

3. The prototype unit was completed in compliance with the agreement between REI and client.

4. A competitive product was discovered that is available at a lower price than this unit can sell for. Because of this fact, and the completion of the agreement to produce a prototype, the project was terminated.

RESOURCES UTILIZED: Rural Enterprises' Staff

FINANCING:

Prepared By: Kathy Hulse

QUARTERLY PROJECT UPDATE

REPORT PERIOD: July 1, 1985 - September 30, 1985

PROJECT TITLE:	Empower
PROJECT NUMBER:	OCID #0-029
PROJECT STATUS:	Active
ORIGINATION DATE:	7-23-85
ORIGINAL EMPLOYEES:	2
EMPLOYEES AT END OF REPORT PERIOD:	5
SOURCE OF REFERRAL:	REI Client

PROJECT DESCRIPTION:

Empower, Inc. sells, distributes and contracts for the manufacture of the product Motor-Aid. Motor-Aid was developed to extend the life of an electric submersible pump by protecting against transients; balancing the power, thereby reducing over-heating; and soft start the motor which greatly reduces shaft breakage.

PROJECT OBJECTIVE:

Product development and financial assistance for the commercialization of the Motor-Aid product.

ACTIVITY DURING REPORTING PERIOD:

1. Information was accumulated to prepare the problem statement for submission to NASA.

2. Financing was secured for Empower, Inc.

RESOURCES UTILIZED: Rural Enterprises' Staff

FINANCING: OCID

Prepared By: Kathy Hulse

QUARTERLY PROJECT UPDATE

REPORT PERIOD: July 1, 1985 - September 30, 1985

PROJECT TITLE: Polycarbonate Sheet Neon Sign
PROJECT NUMBER: BI017
PROJECT STATUS: Active in the secondary evaluation stage
ORIGINATION DATE: 08-20-84
ORIGINAL EMPLOYEES: 0
EMPLOYEES AT END OF REPORT PERIOD: 0
SOURCE OF REFERRAL: Newspaper Article

PROJECT DESCRIPTION:

Process to make neon signs using clear plastic sheets and adhesives instead of glass.

PROJECT OBJECTIVE:

Technology search.

ACTIVITY DURING REPORTING PERIOD:

An appropriate material at a suitably low cost was not found. Project was terminated as a NASA project.

RESOURCES UTILIZED: REI Staff

FINANCING:

Prepared By: Kathy Hulse

QUARTERLY PROJECT UPDATE

REPORT PERIOD: July 1, 1985 - September 30, 1985

PROJECT TITLE: Smokaroma
PROJECT NUMBER: 1208
PROJECT STATUS: Active
ORIGINATION DATE: 06-24-85
ORIGINAL EMPLOYEES: 25
EMPLOYEES AT END OF REPORT PERIOD: 25
SOURCE OF REFERRAL:

PROJECT DESCRIPTION:

Instant Burger, Direct Energy Transfer hamburger cooker.

PROJECT OBJECTIVE:

Provide technical support in the application and administration of a Department of Energy grant. Also transfer technology where applicable from NASA during the redesign of the product.

ACTIVITY DURING REPORTING PERIOD:

1. REI personnel met with the person conducting the second stage evaluation for OERI on the Instant Burger. REI's assistance was requested in order to increase the likelihood of obtaining grant monies for the Department of Energy for the Instant Burger product.

2. The report to OERI was completed and resulted in the recommendation of Instant Burger.

3. The need for engineering/product development assistance was indicated. REI will investigate to determine if NASA technology will add value to the product.

RESOURCES UTILIZED: REI Staff

FINANCING:

Prepared by: Kathy Hulse